

**KALIOFENUSA CARPINIFOLIAE LISTON (HYMENOPTERA:  
TENTHREDINIDAE), A NEWLY RECOGNIZED  
LEAF-MINER ON FIELD ELMS IN BRITAIN**

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Three European leaf-mining sawflies of the genus *Kaliofenusa* Viereck are attached to elm (*Ulmus*) species (Liston, 1993). When the group was first revised, the only British material available to the author was of Scottish origin and exclusively from wych elm (*U. glabra* Hudson). Now it has been possible to study material collected in England, made available by the Natural History Museum, London (NHM) and National Museums of Scotland, Edinburgh (NMS). Two species are represented in this material, one being an addition to the British list of Hymenoptera Symphyta.

IDENTIFICATION

The sawsheath characters mentioned in Liston (1993) are of limited value in the separation of species and might mislead. After examination of longer series of each species, it seems that the sawsheath valvulae of these rather small insects may be prone to severe distortion in dried specimens. By contrast, the form of the frons is very stable and specimens intermediate to *ulmi* and *carpinifoliae* have not been found. Both species key to *Fenusa ulmi* in Benson (1952).

Dr E. Altenhofer sent samples of larvae collected on *U. minor* Miller and *U. glabra* from several central European localities. Apart from the tendency, already observed by Altenhofer in the fresh samples, to a more intense and extended dark coloration on the thoracic segments in the *U. minor* (?*K. carpinifoliae*) samples, no absolute characters were found to separate the larvae. There is however a slight doubt as to the purity of the samples, and the larvae would warrant a study with more sophisticated equipment than that available to the author.

SEPARATION OF BRITISH *KALIOFENUSA* SPECIES

A: Frons with lateral walls appearing deeply indented (Fig. 1). Lateral foveae contained in short, deep ellipsoid furrows which do not run out past the upper edge of the frontal wall (Fig. 1). Apical segment of flagellum more than 1.5 times length of the preceding segment (Fig. 3).

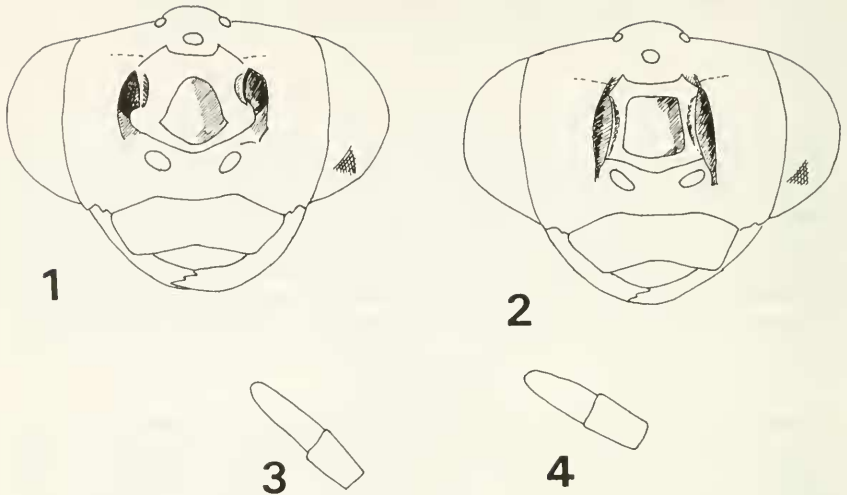
On field elms (*U. minor*, *U. procera* Salisbury), and possibly hybrid elms. Leaf-mines starting mostly in leaf margins (Figs 5–7). . . . . *carpinifoliae* Liston, 1993

B: Frons with lateral walls nearly straight-sided (Fig. 2). Grooves containing lateral foveae long and narrow, furrowed through above to run on to upper surface of head (Fig. 2). Apical segment of flagellum shorter than 1.5 times the length of preceding segment (Fig. 4).

On wych elm (*U. glabra*). Leaf-mines starting mostly in leaf blade interior (Fig. 8).  
. . . . . *ulmi* (Sundevall, 1847)\*

\*The date, 1847, is correct, although 1843 (or 1844) is usually wrongly given. The publication is the 'Transactions of the 4th meeting of Scandinavian natural historians in Christiania', 1844, but it was not published until 1847. The British list (Kloet & Hincks, 1978) contains a couple of printing errors and the date given for *K. ulmi* (1884) is probably a typographic error for the equally incorrect 1844, likewise Sundevall instead of Sundevall.

Students of the Symphyta might also be interested to know that nearly all the dates of publication for Klug species are wrong in the checklist! The original error, copied throughout the European literature lies mostly with Kreichbaumer (1884) who reprinted Klug's works in a single volume but with the dates of the volume year, not the actual year of publication (often a few years later).



Figs 1 and 2. Head viewed from front to show form of frons in 1: *Kaliofenusa carpiniifoliae*; 2: *K. ulmi*.

Figs 3 and 4. Apical flagellar segments of 3: *K. carpiniifoliae*; 4: *K. ulmi*.

#### MATERIAL EXAMINED

##### *Kaliofenusa carpiniifoliae* Liston

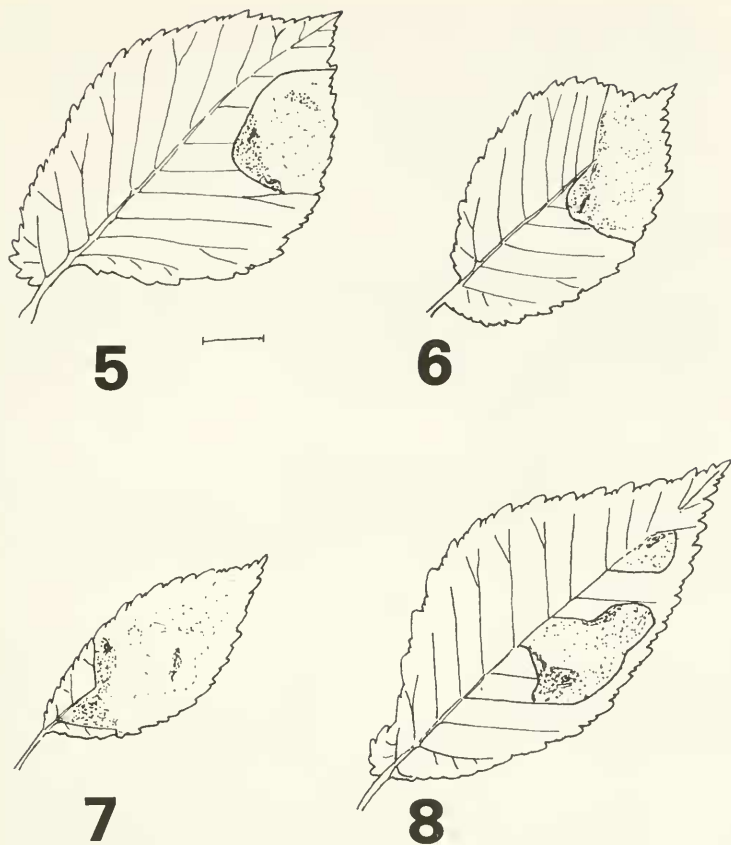
England: 1 female, Sudbury, Suffolk, 1919 (Harwood, Natural History Museum—NHM); 1 female, Badingham, Suffolk, 5.vii.1927 (R. B. Benson, NHM); 4 females, Wimborne, Dorset, 10.v.1936 (B. Rings, NHM); 1 female, Colchester, Essex (Harwood, NHM); 1 female, Reading, Berks., ex mine on *Ulmus procera*, coll. 4.vi.1992 em. 11.vi.1993 (B. J. Parsons/M. R. Shaw, National Museums of Scotland—NMS); 1 male, without locality or date, ex Cameron Collection (NHM) may be of British origin.

##### *Kaliofenusa ulmi* (Sundevall)

England: 1 male, "Gorge Avon", 1903 (J. J. F. X. King, NHM); 1 female, Gade Valley, Herts., 20.v.1934 (R. B. Benson, NHM); 1 female, Boxhill, Surrey, 9.v.1936; 1 female, Claygate, Surrey, 11.v.1937 (J. F. Perkins, NHM); 1 female, Tring, Herts., 21.iv.1946 (R. B. Benson, NHM); 3 females, Beetham, Cumbria, mine on *Ulmus glabra*, coll. 13.vi.1992 em. 17.v.1993 (M. R. Shaw, NMS).

#### BIOLOGY

In Continental Europe, *carpiniifoliae* has been reared only from *Ulmus minor* (= *carpiniifolia* Gleditsch) (Altenhofer, 1980). The record from Reading shows that *U. procera* (English elm) is also used as a host. From Perring & Walters (1962), it appears likely that the host of *carpiniifoliae* in East Anglia may have been *U. minor* or *U. procera*, but in the other localities most probably *U. procera*.



Figs 5-8. Completed leaf-mines, scale line=1 cm. 5: *U. procera*?/*K. carpinifoliae*, Reading, England; 6: *U. minor*/*K. carpinifoliae*, Gottfrieding, Bavaria; 7: *U. minor* var. *sarniensis*?/*K. carpinifoliae*, Edinburgh, Scotland; 8: *U. glabra*/*K. ulmi*, Cumbria, England.

In a sample of mined *U. procera* leaves from which the Reading *carpinifoliae* specimen was obtained, the mines start almost exclusively in the leaf blade margins (Fig. 5). The position of mines in *U. minor* leaves in Germany is similar (Fig. 6), where however the fully developed mine often takes up the whole content of the usually smaller leaves of this elm. Fresh mines often start at or close to the leaf tip. Empty *Kaliopenusa* leaf-mines on *U. minor* var. *sarniensis* (Loud.) Rehd. (Wheatley elm) in Princes Street Gardens, Edinburgh, August 1992 were of this type (Fig. 7).

Oviposition of *K. ulmi* typically takes place in the leaf blade interior; even the completed mines often do not touch the leaf edge (Fig. 8). Because the collection of Reading mines was heavily parasitized by a *Lathrolestes* sp. (Ichneumonidae: Ctenopelmatinae) (M. R. Shaw, pers. comm.), it was not possible to establish whether the few mines in the leaf interiors of *U. procera* were indeed made by *K. ulmi*.

Dr D. R. Smith (pers. comm.) has discovered that the *K. ulmi* populations introduced to North America feed there on at least three elm species which are probably less closely related to one another than are the European elms named here. Nevertheless it seems unwise to extrapolate Smith's findings (which he intends to publish in detail) back to the native European populations. To contend that *ulmi* should feed on all elms present in Europe because it does so in North America is premature in the light of 'regional foodplant change' (Zwölfer, 1970), by which is meant a complex of biotic and abiotic influences which leads to the selection of different hostplants in different parts of the same insect species' range. More data from rearing would help to clarify these problems.

At least in the short term, the future of these sawflies seems well assured despite the continuing destruction of older elms by Dutch elm disease. An abundant food resource is supplied by the sucker regrowth of diseased elm trees. This juvenile type growth is preferentially used by *Kaliofenusa* compared to normal foliage in the crowns of mature trees, and it may be that elm disease has temporarily favoured the local build-up of large populations of these sawflies.

#### ACKNOWLEDGEMENTS

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